

Problem 2.3 Fact Families

A. For each number sentence, write its complete fact family.

1. $\frac{2}{3} + \frac{5}{9} = \frac{11}{9}$

2. $\frac{5}{10} - \frac{2}{5} = \frac{1}{10}$

B. For each mathematical sentence, find the value of N. Then write each complete fact family.

1. $3\frac{3}{5} + 1\frac{2}{3} = N$

2. $3\frac{1}{6} - 1\frac{2}{3} = N$

3. $\frac{3}{4} + N = \frac{17}{12}$

4. $N - \frac{1}{2} = \frac{3}{8}$

C. After writing several fact families, Rochelle claims that subtraction undoes addition. Do you agree or disagree? Explain your reasoning.

D. In the mathematical sentence below, find values for M and N that make the sum exactly 3. Write your answer as a sum that equals 3.

$$\frac{5}{8} + \frac{1}{4} + \frac{2}{3} + M + N = 3$$



ACE Homework starts on page 24.

2.4

Designing Algorithms for Addition and Subtraction



TEKS / TAKS

6(2)B Use addition and subtraction to solve problems involving fractions. **6(13)A** Make conjectures from sets of examples. **6(13)B** Validate conclusions using mathematical relationships.

To become skilled in solving problems that involve addition and subtraction of fractions, you need a plan for carrying out computations. In mathematics, a plan, or a series of steps, for doing a computation is called an **algorithm** (AL guh rith um). For an algorithm to be useful, each step should be clear and precise.

In this problem, you develop algorithms for adding and subtracting fractions. You may develop more than one for each computation. You should understand and feel comfortable with at least one algorithm for adding fractions and at least one algorithm for subtracting fractions.

Problem 2.4 Designing Algorithms for Addition and Subtraction

- A. 1.** Find the sums in each group.

Group 1	Group 2	Group 3
$2\frac{2}{9} + \frac{4}{9}$	$\frac{4}{9} + \frac{1}{3}$	$\frac{1}{8} + \frac{2}{3}$
$\frac{5}{8} + \frac{1}{8}$	$2\frac{1}{2} + \frac{5}{12}$	$\frac{2}{9} + 3\frac{1}{4}$
$\frac{3}{5} + \frac{9}{5}$	$\frac{7}{8} + \frac{1}{2}$	$3\frac{4}{5} + 3\frac{3}{4}$

- Describe what the problems in each group have in common.
- Make up one new problem that fits in each group.
- Write an algorithm that will work for adding *any* two fractions including mixed numbers. Test your algorithm on the problems in the table. If necessary, change your algorithm until you think it will work all the time.

- B. 1.** Find the differences in each group.

Group 1	Group 2	Group 3
$3\frac{5}{6} - \frac{1}{6}$	$1\frac{3}{4} - \frac{1}{8}$	$3\frac{5}{6} - 1\frac{1}{4}$
$\frac{11}{7} - \frac{1}{7}$	$2\frac{7}{16} - 2\frac{1}{4}$	$\frac{1}{4} - \frac{1}{5}$
$1\frac{2}{3} - \frac{1}{3}$	$6\frac{7}{8} - 3\frac{3}{4}$	$4\frac{3}{5} - \frac{1}{3}$

- Describe what the problems in each group have in common.
- Make up one new problem that fits in each group.
- Write an algorithm that will work for subtracting *any* two fractions, including mixed numbers. Test your algorithm on the problems in the table.
- Describe how the subtraction problems below are different from the problems in the subtraction table in part (1).

Group 1	Group 2	Group 3
$1\frac{1}{3} - \frac{2}{3}$	$6\frac{3}{4} - 3\frac{7}{8}$	$3\frac{1}{4} - 1\frac{5}{6}$

- If needed, change your algorithm until you think it will work all the time.
- Use your algorithms for addition and subtraction to find each sum or difference.

1. $8 - 2\frac{2}{3}$ 2. $8\frac{2}{3} - 2$ 3. $2\frac{7}{16} + \frac{4}{9}$ 4. $1\frac{4}{5} + 1\frac{5}{6} + 1\frac{3}{4}$

ACE Homework starts on page 24.